

Amendments to the Specification:

Please insert the following paragraph at page 1, line 5:

This application is a divisional of U.S. Patent Application Serial No. 09/194,008, filed March 17, 1999, which is a U.S. National Phase Application of PCT International Application PCT/JP98/01084.

Please replace the paragraph beginning at page 6, line 3, with the following:

When inputting a video as the waveform data ~~of claim C1~~ of the present invention or outputting a video as the waveform data ~~of claim C7~~ of the present invention as means for solving the problem 1, a problem may be left that the substantial working efficiency of a transmission line is lowered because a part of a transmitted bit stream is not used. Moreover, there are some coding systems that generate a present decoded video in accordance with a last decoded picture (e.g. P picture). However, because the last decoded picture is not completely restored by the means for solving the problem 1, there is a problem that deterioration of the picture quality influentially increases as time passes.

Please replace the paragraph beginning at page 7, line 2, with the following:

When considering the problems (A1) to (A6) ~~of the first prior art~~, it is an object of the present invention to provide an audio-video transmitter and audio-video receiver and data-processing apparatus and method in order to solve at least any one of the problems.

Please replace the paragraph beginning at page 7, line 7, with the following:

Moreover, when considering the problems (B1) and (B2) ~~of the second prior art~~, it is another object of the present invention to provide data-processing apparatus and method in order to solve at least one of the problems.

Please replace the paragraph beginning at page 7, line 11, with the following:

Furthermore, when considering the problems (C1) to (C3) ~~of the last prior art~~, it is still another object of the present invention to provide waveform-data-receiving method and apparatus and waveform-data-transmitting method and apparatus, and

transmitting method and apparatus and video-receiving method and apparatus in order to solve at least one of the problems.

Please replace the paragraph beginning at page 7, line 18, with the following:

The present invention ~~according to claim 1~~ is an audio-video transmitting apparatus comprising transmitting means for transmitting the content concerned with transmitting method and/or the structure of data to be transmitted or an identifier indicating the content as transmission format information through a transmission line as that of the data to be transmitted or a transmission line different from the transmission line; wherein

Please replace the paragraph beginning at page 8, line 1, with the following:

~~The present invention according to claim 2 is the audio-video transmitting apparatus according to claim 1~~ One aspect of the present invention is the audio-video transmitting apparatus, wherein said transmission format information is included in at least one of data control information added to said data to control said data, transmission control information added to said data to transmit said data, and information for controlling the processing of the terminal side.

Please replace the paragraph beginning at page 8, line 8, with the following:

~~The present invention according to claim 3 is the audio-video transmitting apparatus according to claim 2~~ Another aspect of the present invention is the audio-video transmitting apparatus, wherein at least one of said data control information, transmission control information, and information for controlling the processing of said terminal side is dynamically changed.

Please replace the paragraph beginning at page 8, line 14, with the following:

~~The present invention according to claim 4 is the audio-video transmitting apparatus according to claim 3~~ Still another aspect of the present invention is the audio-video transmitting apparatus, wherein said data is divided into a plurality of packets, and said data control information or said transmission control information is added not only to the head packet of said divided packets but also to a middle packet item.

Please replace the paragraph beginning at page 8, line 20, with the following:

~~The present invention according to claim 5 is the audio-video transmitting apparatus according to claim 1~~Yet another aspect of the present invention is the audio-video transmitting apparatus, wherein an identifier showing whether to use timing information concerned with said data as information showing the reproducing time of said data is included in said transmission format information.

Please replace the paragraph beginning at page 8, line 26, with the following:

~~The present invention according to claim 6 is the audio-video transmitting apparatus according to claim 1~~Still yet another aspect of the present invention is the audio-video transmitting apparatus, wherein said transmission format information is the structural information of said data and a signal which is output from a receiving apparatus receiving the transmitted structural information of said data and which can be received is confirmed and thereafter, said transmitting means transmits corresponding data to said receiving apparatus.

Please replace the paragraph beginning at page 9, line 7, with the following:

~~The present invention according to claim 7 is the audio-video transmitting apparatus according to claim 1~~A further aspect of the present invention is the audio-video transmitting apparatus, wherein said transmission format information include (1) an identifier for identifying a program or data to be used by a receiving apparatus later and (2) at least one of a flag, counter, and timer as information for knowing the point of time in which said program or data is used or the term of validity for using said program or data.

Please replace the paragraph beginning at page 9, line 15, with the following:

~~The present invention according to claim 8 is the audio-video transmitting apparatus according to claim 7~~Still a further aspect of the present invention is the audio-video transmitting apparatus, wherein said point of time in which said program or data is used is transmitted as transmission control information by using a transmission serial number for identifying a transmission sequence or as information to be transmitted by a packet different from that of data to control terminal-side processing.

Please replace the paragraph beginning at page 9, line 23, with the following:

~~The present invention according to claim 9 is the audio-video transmitting~~

~~apparatus according to claim 2 or 3~~Still yet a further aspect of the present invention is the audio-video transmitting apparatus, wherein storing means for storing a plurality of contents concerned with said transmitting method and/or said structure of data to be transmitted and a plurality of its identifiers are included, and said identifier is included in at least one of said data control information, transmission control information, and information for controlling terminal-side processing as said transmission format information.

Please replace the paragraph beginning at page 10, line 5, with the following:

~~The present invention according to claim 10 is the audio-video transmitting apparatus according to claim 2 or 3~~Another aspect of the present invention is the audio-video transmitting apparatus, wherein storing means for storing a plurality of contents concerned with said transmitting method and/or said structure of data to be transmitted are included, and

Please replace the paragraph beginning at page 10, line 14, with the following:

~~The present invention according to claim 11 is the audio-video transmitting apparatus according to claim 1, 2, or 3~~Still another aspect of the present invention is the audio-video transmitting apparatus, wherein a default identifier showing whether to change the contents concerned with said transmitting method and/or structure of data to be transmitted is added.

Please replace the paragraph beginning at page 10, line 19, with the following:

~~The present invention according to claim 12 is the audio-video transmitting apparatus according to claim 9, 10, or 11~~Still yet another aspect of the present invention is the audio-video transmitting apparatus, wherein said identifier or said default identifier is added to a predetermined fixed-length region of information to be transmitted or said predetermined position.

Please replace the paragraph beginning at page 10, line 25, with the following:

~~The present invention according to claim 13~~A further aspect of the present invention is an audio-video receiving apparatus comprising: receiving means for receiving said transmission format information transmitted from the audio-video transmitting apparatus ~~of any one of claims 1 to 12~~; and transmitted-information interpreting means for interpreting said received transmission-format information.

Please replace the paragraph beginning at page 11, line 4, with the following:

~~The present invention according to claim 14 is the audio-video receiving apparatus according to claim 13~~ A still further aspect of the present invention is the audio-video receiving apparatus, wherein storing means for storing a plurality of contents concerned with said transmitting method and/or said structure of data to be transmitted and a plurality of its identifiers are included, and the contents stored in said storing means are used to interpret said transmission format information.

Please replace the paragraph beginning at page 11, line 12, with the following:

~~The present invention according to claim 15~~ A still yet further aspect of the present invention is an audio-video transmitting apparatus comprising: information multiplexing means for controlling start and end of multiplexing the information for a plurality of logical transmission lines for transmitting data and/or control information is included; wherein, not only said data and/or control information multiplexed by said information multiplexing means but also control contents concerned with start and end of said multiplexing by said information multiplexing means are transmitted as multiplexing control information, and said data includes video data and/or audio data.

Please replace the paragraph beginning at page 11, line 24, with the following:

~~The present invention according to claim 16 is the audio-video transmitting apparatus according to claim 15~~ Another aspect of the present invention is the audio-video transmitting apparatus, wherein it is possible to select whether to transmit said multiplexing control information by arranging said information without multiplexing it before said data and/or control information or transmit said multiplexing control information through a transmission line different from the transmission line for transmitting said data and/or control information.

Please replace the paragraph beginning at page 12, line 5, with the following:

~~The present invention according to claim 17~~ Still another aspect of the present invention is an audio-video receiving apparatus comprising: receiving means for receiving said multiplexing control information transmitted from the audio-video transmitting apparatus of claim 15 and said multiplexed data and/or control information; and separating means for separating said multiplexed data and/or control information in accordance with said multiplexing control information.

Please replace the paragraph beginning at page 12, line 13, with the following:

~~The present invention according to claim 18~~Yet another aspect of the present invention is an audio-video receiving apparatus comprising: main looking-listening means for looking at and listening to a broadcast program; and auxiliary looking-listening means for cyclically detecting the state of a broadcast program other than the broadcast program looked and listened through said main looking-listening means; wherein said detection is performed so that a program and/or data necessary when said broadcast program looked and listened through said main looking-listening means is switched to other broadcast program can be smoothly processed, and

said data includes video data and/or audio data.

Please replace the paragraph beginning at page 12, line 25, with the following:

~~The present invention according to claim 19 is the audio-video transmitting apparatus according to claim 1~~Still yet another aspect of the present invention is the audio-video transmitting apparatus, wherein priority values can be changed in accordance with the situation by transmitting the offset value of information showing the priority for processing of said data.

Please replace the paragraph beginning at page 13, line 3, with the following:

~~The present invention according to claim 20~~A further aspect of the present invention is an audio-video receiving apparatus comprising: receiving means for receiving encoded information to which the information concerned with the priority for processing under an overload state is previously added; and priority deciding means for deciding a threshold serving as a criterion for selecting whether to process an object in said information received by said receiving means; wherein

Please replace the paragraph beginning at page 13, line 18, with the following:

~~The present invention according to claim 21 is the audio-video receiving apparatus according to claim 20~~A still further aspect of the present invention is the audio-video transmitting apparatus, wherein retransmission-request-priority deciding means for deciding a threshold serving as a criterion for selecting whether to request retransmission of some of said information not received because it is lost under transmission when it is necessary to retransmit said information is included, and

Please replace the paragraph beginning at page 14, line 3, with the following:

~~The present invention according to claim 22~~A yet further aspect of the present

invention is an audio-video transmitting apparatus comprising: retransmission-priority deciding means for deciding a threshold serving as a criterion for selecting whether to request retransmission of some of said information not received because it is lost under transmission when retransmission of said unreceived information is requested is included, wherein said decided threshold is decided in accordance with at least one of the priority controlled by the priority deciding means of said audio-video receiving apparatus of claim 20, retransmission frequency, lost factor of information, insertion interval between in-frame-encoded frames, and grading of priority.

Please replace the paragraph beginning at page 14, line 16, with the following:

~~The present invention according to claim 23~~ A still yet further aspect of the present invention is an audio-video transmitting apparatus for transmitting said encoded information by using the priority added to said encoded information and thereby thinning it when (1) an actual transfer rate exceeds the target transfer rate of information for a video or audio or (2) it is decided that writing of said encoded information into a transmitting buffer is delayed as the result of comparing the elapsed time after start of transmission with a period to be decoded or output added to said encoded information.

Please replace the paragraph beginning at page 14, line 26, with the following:

~~The present invention according to claim 25~~ Another aspect of the present invention is a data processing apparatus comprising: receiving means for receiving a data series including (1) time-series data for audio or video, (2) an inter-time-series-data priority showing the priority of the processing between said time-series-data values, and (3) a plurality of in-time-series-data priorities for dividing said time-series data value to show the processing priority between divided data values; and data processing means for performing processing by using said inter-time-series-data priority and said in-time-series-data priority together when pluralities of said time-series-data values are simultaneously present.

Please replace the paragraph beginning at page 15, line 11, with the following:

~~The present invention according to claim 27~~ Still another aspect of the present invention is a data processing apparatus comprising: receiving means for receiving a data series including (1) time-series data for audio or video, (2) an inter-time-series-data priority showing the priority of the processing between said time-series-data values, and (3) a plurality of in-time-series-data priorities for dividing said time-series

data value to show the processing priority between divided data values; and data processing means for distributing throughput to each of said time-series-data values in accordance with said inter-time-series-data priority and moreover, adaptively deteriorating the processing quality of the divided data in said time-series data in accordance with said in-time-series-data priority so that each of said time-series-data values is kept within said distributed throughput.

Please replace the paragraph beginning at page 15, line 27, with the following:

~~The present invention according to claim 29~~ Yet another aspect of the present invention is a data processing apparatus characterized by, when an in-time-series-data priority for a video is added every frame of said video and said video for each frame is divided into a plurality of packets, adding said in-time-series-data priority only to the header portion of a packet for transmitting the head portion of a frame of said video accessible as independent information.

Please replace the paragraph beginning at page 16, line 7, with the following:

~~The present invention according to claim 31 is the data processing apparatus according to any one of claims 25, 27, and 29~~ Still yet another aspect of the present invention is the data processing apparatus, wherein said in-time-series-data priority is described in the header of a packet to perform priority processing.

Please replace the paragraph beginning at page 16, line 12, with the following:

~~The present invention according to claim 33 is the data processing apparatus according to any one of claims 25, 27, and 29~~ A further aspect of the present invention is the data processing apparatus, wherein the range of a value capable of expressing said in-time-series-data priority is made variable to perform priority processing.

Please replace the paragraph beginning at page 16, line 17, with the following:

~~The present invention according to claim 34~~ A still further aspect of the present invention is a data processing method comprising the steps of: inputting a data series including time-series data for audio or video and an inter-time-series-data priority showing the processing priority between said time-series data values; and

Please replace the paragraph beginning at page 16, line 25, with the following:

~~The present invention according to claim 36~~ A yet further aspect of the present invention is a data processing method comprising the steps of: classifying time-series data values for audio or video; inputting a data series including said time-series data

and a plurality of in-time-series-data priorities showing the processing priority between said classified data values; and processing priorities by using said in-time-series-data priority as the value of a relative or absolute priority.

Please replace the paragraph beginning at page 17, line 5, with the following:

Moreover, ~~to solve the problem (C1),~~ the present invention is characterized by:

Please replace the paragraph beginning at page 17, line 7, with the following:

inputting, for example, a video as waveform data in accordance with the waveform-data-transmitting method ~~of claim 63~~; or

Please replace the paragraph beginning at page 17, line 10, with the following:

outputting, for example, a video as waveform data in accordance with the waveform-data-receiving method ~~of claim 69~~.

Please replace the paragraph beginning at page 17, line 13, with the following:

Moreover, ~~to solve the problem (C2),~~ the present invention is characterized by:

Please replace the paragraph beginning at page 17, line 15, with the following:

(d) outputting the execution time of each group obtained through estimation in accordance with the waveform-data-receiving method ~~of claim 69~~; or

Please replace the paragraph beginning at page 17, line 20, with the following:

(e) computing the execution frequency of each group for completing decoding within a time required to transmit a code length determined by the designation of a rate controller or the like in accordance with each execution time of the receiving means in accordance with the wave-data-transmitting method ~~of claim 63~~.

Please replace the paragraph beginning at page 17, line 26, with the following:

Furthermore, ~~to solve the problem (C3),~~ the present invention is characterized by:

Please replace the paragraph beginning at page 18, line 5, with the following:

(e) estimating the processing time required to encode a video by using the above execution time and computing the execution frequency of each group in which the processing time does not exceed a time usable to process one sheet of picture

determined by a frame rate given as the designation of a user in accordance with the waveform data-transmitting method of claim 67.

Please delete the paragraph beginning at page 18, line 24 in its entirety.

Please delete the paragraph beginning at page 19, line 5, in its entirety.

Please delete the paragraph beginning at page 19, line 14, in its entirety.

Please insert before the title Best Mode for Carrying Out the Invention on page 25, the sentence:

The entire disclosure of U.S. Patent Application No. 09/194,008, filed March 17, 1999, is expressly incorporated by reference herein.

Please delete the paragraph beginning at page 93, line 22, in its entirety.

Please delete the paragraph beginning at page 94, line 27, in its entirety.

Please replace the paragraph beginning at page 97, line 20, with the following:

According to the above-described first and third embodiments, the execution time of decoding is estimated in accordance with the estimated execution time of each element and, when the decoding execution time may exceed the time (designated time) required to receive the data for one sheet, halfpixel prediction having a long execution time is replaced with fullpixel prediction. Thereby, it is possible to prevent an execution time from exceeding a designated time and solve the problem (C1) (~~corresponding to claims 68 and 74~~).

Please replace the paragraph beginning at page 98, line 3, with the following:

Moreover, a case of regarding the parts of indispensable and dispensable processings as two groups ~~corresponds to claims 66 and 72~~ and a case of regarding the part of a video as waveform data ~~corresponds to claims 64 and 70~~.

Please replace the paragraph beginning at page 100, line 3, with the following:

According to the above-described second and fourth embodiments, the execution time of decoding is estimated in accordance with the estimated execution time of each element and, when the execution time may exceed the time required to receive the data for one sheet (designated time), halfpixel prediction having a long

execution time is replaced with fullpixel prediction. Thereby, it is possible to prevent an execution time from exceeding a designated time and solve the problem (C1) ~~(corresponding to claims 67 and 73).~~

Please replace the paragraph beginning at page 100, line 13, with the following:

Furthermore, a case of regarding the parts of dispensable and indispensable processings as two groups corresponds to claims 65 and 71 and a case of regarding the part of a video as waveform data ~~corresponds to claims 63 and 69.~~

Please replace the paragraph beginning at page 103, line 12, with the following:

According to the above-described fifth and sixth embodiments, the execution time of each estimated element is transmitted to the transmitting side, the execution time of decoding is estimated at the transmitting side, and halfpixel prediction having a long execution time is replaced with fullpixel prediction so that the estimated decoding execution time does not exceed the time (designated time) probably required to receive the data for one sheet. Thereby, the information for halfpixel prediction among the sent encoded information is not disused and thereby, it is possible to prevent an execution time from exceeding a designated time and solve the problem (C2) ~~(corresponding to claims 76 and 78).~~

Please replace the paragraph beginning at page 105, line 16, with the following:

According to the paragraph beginning with the final "Moreover" of the descriptive portion of the fifth embodiment and the seventh embodiment, the estimated execution time of each element is transmitted to the transmitting side, the execution time of decoding is estimated at the transmitting side, and halfpixel prediction having a long execution time is replaced with fullpixel prediction so that the estimated decoding execution time does not exceed the time (designated time) probably required to receive the data for one sheet. Thereby, the information for halfpixel prediction among the sent encoded information is not disused and it is possible to prevent the execution time from exceeding the designated time and solve the problem (C2) ~~(corresponding to claims 75 and 77).~~

Please replace the paragraph beginning at page 108, line 11, with the following:

The above eighth embodiment makes it possible to solve the problem (C3) by estimating the execution time of each processing, estimating an execution time required for encoding in accordance with the estimated execution time, and deciding an execution frequency so that the estimated encoding time becomes equal to or shorter than the time usable for encoding of a picture determined in accordance with a frame rate ~~(corresponding to claim 80)~~.

Please replace the paragraph beginning at page 110, line 15, with the following:

According to the above-described ninth embodiment, the execution time of each processing is estimated and an execution time required for encoding is previously measured in accordance with the estimated execution time. Thus, it is possible to solve the problem (C3) by deciding an actual execution frequency so that the estimated encoding time becomes the time usable for the encoding of a picture determined in accordance with a frame rate or shorter ~~(corresponding to claim 79)~~.

Please replace the paragraph beginning at page 111, line 1, with the following:

Moreover, in the case of the fourth embodiment, it is also possible to extract a code length from the two-byte region when multiplexed data is input in step 902 and use the code transmission time obtained from the code length and the code transmission rate for the execution frequency calculation in step 905 (the execution frequency of halfpixel prediction is decreased so as not to exceed the code transmission time). ~~This corresponds to claims 81 and 83.~~

Please replace the paragraph beginning at page 111, line 15, with the following:

Furthermore, in the case of the third embodiment, it is also possible to extract a code length from the two-byte region when multiplexed data is input in step 301 and use a code transmission time obtained from the code length and the code transmission rate for the execution frequency calculation in step 304 (the execution frequency of halfpixel prediction is decreased so as not to exceed the code transmission time). ~~This corresponds to claims 82 and 84.~~

Please replace the paragraph beginning at page 111, line 24, with the following:

Furthermore, in the case of the fourth embodiment, an actual execution frequency of halfpixel prediction is recorded immediately after step 909 to calculate a maximum value. When the maximum value is equal to or less than a small-enough value (e.g. 2 or 3), it is also possible to generate a data string (data string comprising a specific bit pattern) showing that halfpixel prediction is not used and transmit the generated data string. Furthermore, in the case of the second embodiment, it is confirmed whether the data string is received immediately after step 808 and when the data string showing that halfpixel prediction is not used is received, it is also possible to make movement compensation processing always serve as fullpixel prediction in step 808. ~~This corresponds to claims 93 and 91.~~

Please replace the paragraph beginning at page 112, line 11, with the following:

Furthermore, the above concept can be applied to cases other than movement compensation. For example, it is possible to reduce the DCT calculation time by using no high-frequency component for DCT calculation. That is, in the case of a receiving method, when the rate of the IDCT-calculation execution time to the entire execution time exceeds a certain value, a data string showing that the rate exceeds a certain value is transmitted to the transmitting side. When the transmitting side receives the data string, it is also possible to calculate only low-frequency components through the DCT calculation and decrease all high-frequency components to zero. ~~This corresponds to claim 89.~~

Please replace the paragraph beginning at page 112, line 24, with the following: Furthermore, though the embodiment is described above by using a picture, it is possible to apply each of the above methods to audio instead of video. ~~This corresponds to claims 85 and 87.~~

Please replace the paragraph beginning at page 113, line 1, with the following:

Furthermore, in the case of the third embodiment, an actual execution frequency of halfpixel prediction is recorded in step 3034 to calculate a maximum execution frequency. Then, when the maximum value is a small-enough value or less

(e.g. 2 or 3), it is possible to generate and transmit a data string showing that halfpixel prediction is not used (data string comprising a specific bit pattern). Furthermore, in the case of the first embodiment, when receiving a data string showing that halfpixel prediction is not used, it is possible to make the movement compensation processing in step 1022 always serve as fullpixel prediction. ~~This corresponds to claims 94 and 92.~~

Please replace the paragraph beginning at page 113, line 22, with the following:

When the transmitting side receives the data string, it is possible to calculate only low-frequency components through the DCT calculation and reduce all high-frequency components to zero. ~~This corresponds to claim 90.~~

Please replace the paragraph beginning at page 113, line 26, with the following:

Furthermore, though the embodiment is described above by using a picture, it is also possible to apply the above method to audio instead of picture. ~~This corresponds to claims 86 and 88.~~

Please replace the paragraph beginning at page 114, line 3, with the following:

As described above, according to ~~claims 68 and 74 (e.g. the first and third embodiments)~~, the execution time of decoding is estimated in accordance with the estimated execution time of each element and, when the estimated decoding execution time may exceed the time (designated time) required to receive the data for one sheet, halfpixel prediction having a long execution time is replaced with fullpixel prediction. Thereby, it is possible to prevent the execution time from exceeding the designated time and solve the problem (C1).

Please replace the paragraph beginning at page 114, line 13, with the following:

Furthermore, according to ~~claims 75 and 77 (e.g. the fifth and seventh embodiments)~~, the estimated execution time of each element is transmitted to the transmitting side, the execution time of decoding is estimated at the transmitting side, and halfpixel prediction having a long execution time is replaced with fullpixel

prediction so that the estimated decoding time does not exceed the time (designated time) probably required to receive the data for one sheet. Thereby, the information for halfpixel prediction in the sent encoded information is not disused and it is possible to prevent the execution time from exceeding the designated time and solve the problem (C2).

Please replace the paragraph beginning at page 114, line 25, with the following:

Furthermore, according to ~~claim 79 (e.g. the ninth embodiment)~~, it is possible to solve the problem (C3) by estimating the execution time of each processing, moreover estimating the execution time required for encoding in accordance with the estimated execution time, and deciding an executing frequency so that the estimated encoding time becomes equal to or less than the time usable for encoding of a picture decided in accordance with a frame rate.